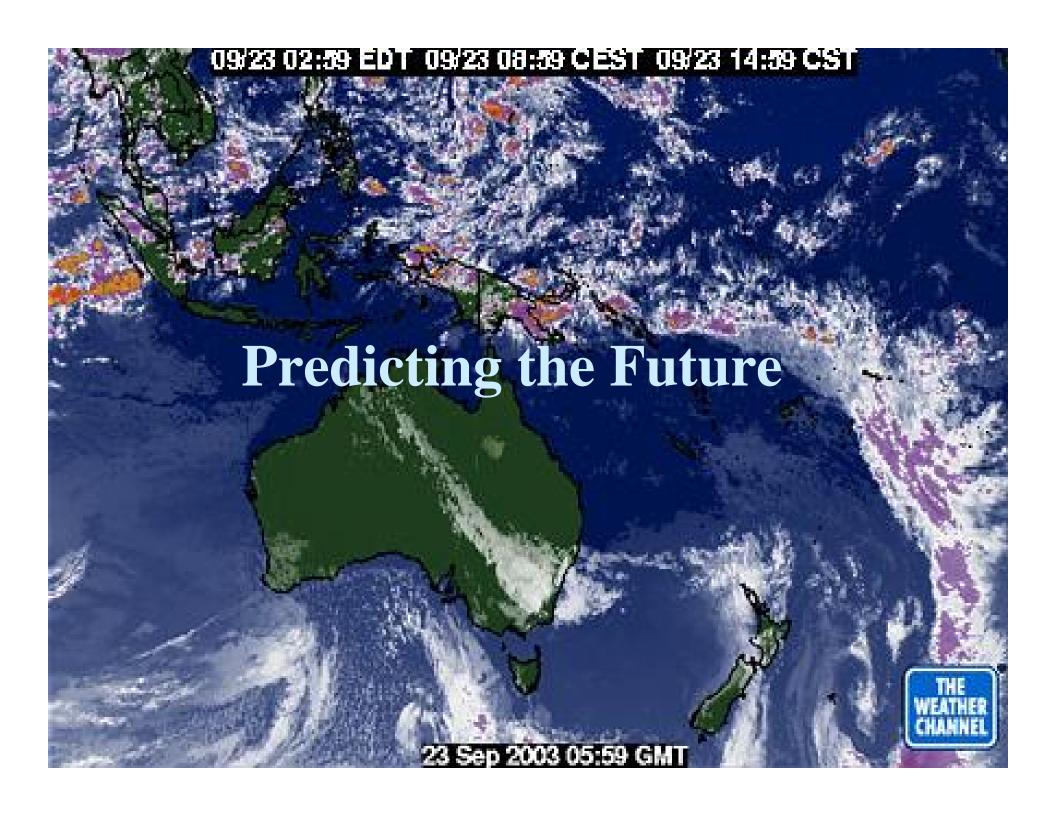
Ecological Forecasting – An Introduction



What is Ecological Forecasting?

Two General Approaches





A forecast is the best estimate from a particular method, model, or individual. The public and decision makers understand that a forecast may or may not turn out to be true."

Reid et al. (2002) ... Millennium Assessment (MA)

General Goals of Ecological Forecasting

- Vulnerability/risk assessments based on current patterns of conditions and stresses
- Vulnerability/risk assessments based on potential future environments
 - Predictions (e.g., land cover change models)
 - Scenarios (based on plausible changes of future environmental change)
 - Scenarios based on stakeholder input
- Adopt management approaches to reduce vulnerability and risks

Forecasting Generally Involves

- Extensive use of models relating ecological endpoints and important processes to biophysical variables (conditions) and natural and anthropogenic stress
- Scenario development of future conditions of biophysical variables and stressors ... to evaluate the consequences of certain types of changes
- Scenarios of change not prediction

Forecasting Applications

- Invasive Species ... vulnerability to spread (USGS/NASA/EPA)
- Multiple Ecological Resource Vulnerability (ReVA)
 - Current vulnerability
 - Consequences of landscape change projections/scenarios on ecological endpoints and processes
- Estuary and Coastal Waters ...
 vulnerability of important processes and
 resources to future climate change
 scenarios (NOAA)

Forecasting Applications

- Disaster forecasting
 - Fire/floods (many organizations)
- Alternative future urbanization consequences (7 counties in Maryland)
- Alternative landscape futures ... impact on multiple resources (EPA Corvallis)
- Interagency Working Group on Earth Observations (IWGEO)

Some Limitations/Issues

- Many assumptions about future change
- "Space-for-Time" construction of models to determine consequences of future change
- Change models based on historical patterns of change which may not accurately reflect future changes ... sequence and magnitude of drivers, and species responses, may not repeat history
- Ecosystems are complex
- Scaling (upscaling and downscaling)
- Limited number of fixed monitoring sites to establish pattern of historical change and relationships to drivers of change

